

RENSEL ASSOCIATES *Aquatic Sciences*

Mr. David Peeler
Mr. Ken Koch
Water Quality Program
Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

RE: Status of Moses Lake Water Quality Assessment, public review comments

Dear Mr. Peeler and Mr. Koch,

I am responding to your letter of 29 October 2004 concerning my previously filed comments about the Department's draft Moses Lake water quality assessment. My comments on your letter are divided by topic as follows.

Response to initial public comments:

Unfortunately, I have to say that the Department does not seem to have responded to the technical points of my letter and several other commenters, in a specific or even programmatic sense. One paragraph was devoted to the lake on the Department's web site responsiveness survey, and none of the details addressed.

I submit that the sole purpose of a public review of water quality assessment is not to solicit new data, as the scant response sheet attached to your letter implies. I respectfully ask that the Department please address the issues presented in my letter. A key point of my letter was that the data shows that the present 50 µg/L criterion is largely being achieved at present and over the past 10 years, but there is uncertainty due to lack of properly-stratified sampling effort. Any possible exceedence of the criterion over this time period, if it exists, is by the narrowness of margins, and in total, the lake certainly does not exceed it. Only by dividing the lake into geographical but perhaps not limnology based and defensible subareas, is one of the subareas possibly showing exceedence and then only through the use of questionable data (see below).

The Department should systematically address this point and the previous comments of all the responders. In addition to the issues raised previously, I raise new issues here that interrelate with prior comments as follows:

Single TP criterion and lack of protection from incipient macrophyte problems

The entire assessment process has been marked by Department's apparent preconceived notion that the lake should be listed and that all the risks lie in the direction of too much phosphorus. Certainly we all agree that the lake is eutrophic and may have been so for a very long time but this approach doesn't protect lake uses

should TP levels drop significantly below 50 µg/L and macrophytes including milfoil become intensively established. I am not alone in this view, your consultant Professor Gene Welch has voiced the same concern and stated¹

"More precise management of dilution water is important for keeping enough TP and algae in the lake to limit expansion of macrophytes".

Since the Department is apparently of the opinion that irrigation authorities will not commit to regular or prescriptive dilution with Columbia (River) Basin water, managing TP levels to the low side will become more difficult, if not impossible.

If anthropogenic sources of P are significant in the nutrient budget of the lake, and such sources can be reduced significantly, the end product may be a lake carpeted with macrophytes and all the reduced use (extirpation of fishing, swimming, boating, waterfowl use, etc.) and water quality impacts (e.g., low dissolved oxygen) problems associated with macrophyte dominance in such a relatively shallow lake. For the past several years the evidence indicates that the lake is trending down in phosphorus concentrations, so this may already be occurring. Only in one year where rainfall was 100% more than normal are there relatively high data, and as others have pointed out, some of these data were estimates. There are no quantitative assessments (aerial, boat or other) of the macrophyte situation in the lake as far as I can determine.

A digital search of both the groundwater and surface water TMDL reports for Moses Lake shows the word macrophyte is not even mentioned in either. From my work in the Columbia River I know that macrophytes are not capable of growing in all habitats and bottom types, but we have enough examples of other shallow, eutrophic lakes that have become overwhelmed by aquatic weeds to know that ignoring such a profound risk is not a wise policy. I am suggesting that the Department try to think outside the box on this, and establish a range of acceptable phosphorus concentrations around the 50 µg/L level to properly manage risks in both directions.

Monitoring and problems with Department policy

I believe further monitoring would be productive, but on two accounts the process requires amendment:

1) Sampling should be year round, not just summer months. We have no data for winter, and can not assume that major loadings by wild birds in winter are flushed out of the lake by the following spring (see my previous memo to the Moses Lake Committee for loading estimates). For example, a cold winter followed by a wet spring and early summer would result in greatly reduced flushing rate to the average and TP levels could be greatly enhanced on that account. One purpose of a TMDL is to determine, as

¹ From October 16, 2003 letter report response to comments on the draft TMDL surface water report, titled Response to review comment on the draft Moses Lake total maximum daily load phosphorus study technical document, authored by D. Knight and J. Bellatty.

accurately as possible, rate of contribution from contributing sources. To a large extent, this has not been done for Moses Lake by the surface or groundwater studies. EPA also agrees that year round phosphorus information is needed and of key importance²

2) Ecology's Policy 11-1 calls for use of random sampled data to perform assessments. That is fine if we adhere to the underlying rules of statistical sampling. However, it is not scientifically and statistically defensible to treat all monitoring results as randomly collected when we know, with great certainty, that Columbia Basin irrigation flow into the lake is THE principle factor controlling interannual variation of total phosphorus concentration during the growing season. By pretending that we don't know this or treating the data as truly random, we violate the assumptions of basic sampling theory and statistics.

By all accounts, we know that summer TP in Moses Lake is very strongly inversely correlated with irrigation throughout. Future data must be qualified with regard to the 10 year mean irrigation flow through the lake as older data are not applicable due to changes in agricultural irrigation practices and volumes. If not conducted in this manner, sampling results in unusually dry or wet years (e.g., 1998, 100% greater rainfall than normal at Ephrata in summer months) can introduce serious bias and result in incorrect conclusions regarding status and trends. Basic statistical principles of random sampling are violated if we ignore what we already know about interannual variation. I understand that at least some Department technical staff are aware of this problem and it would be best to amend policy or make a decision to deal with this obvious problem in the present case.

Questionable data and conclusions

If the entire data base was properly quality controlled by removing uncertain estimates (data qualified as "J" code), no exceedence of the TP criterion would occur, either in total or for the Parker Horn on its own. Additionally, apparently some data from other parts of the lake that were summarized as validated data was mistakenly not qualified as an estimate.

Mr. Parsons from Troutlodge has repeatedly asked for details of these laboratory estimates, but no details have been forthcoming other than a note that the standards showed results outside (high or low?) the acceptable range. Are there no records to document these estimates? This controversy goes to illustrate the narrowness of the exceedence, if any, and the need to properly deal with past and present errors, omissions and lack of substantiation of analyses.

² Comments of Mr. Larry Gadbois, U.S. EPA, Letter to Ecology dated December 17, 2002 regarding the draft TMDL phosphorus study. "The year-round nature of phosphorus control is not a strong component of the document, and would be a valuable addition to the document as well as the key to long-term water quality."

Use of Grids or Segments

While the Department has proposed a "grid" method of subdividing the lake for water quality assessment, it has not provided us with any substantiation for the selection and deletion of data that went into this new approach. Why were some data used and some not? Why are there two subareas in Rocky Ford Arm, and only one in other areas. Are the segments based on geographical or limnological (physicochemical and biological) lumping? Why is this method now being applied, several years into the process?

Thank you for your attention to these matters,

Sincerely,

A handwritten signature in dark ink, appearing to read "Jack Rensel". The signature is fluid and cursive, with the first name "Jack" written in a larger, more prominent script than the last name "Rensel".

J.E. Jack Rensel, Ph.D

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